NAME: Muhammad Umair
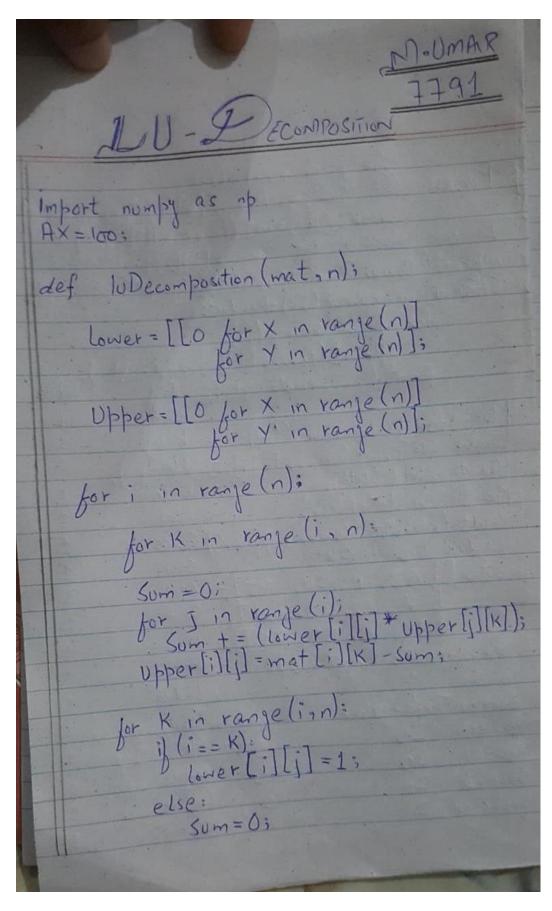**ID: 7791**
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LU DECOMPOSITION

S#	Functions	Tolerance	No. of Iterations	Root		
1	**83x + 11y − 4z = 95** **7x + 52y + 13z = 104** **3x + 8y + 29z = 71**			**Upper Triangular Matrix:**		
				[83	11	-4]
				[0	51.12	13.32]
				[0	0	27.162]
				Lower Triangular Matrix		
				[1	0	0]
				[0.08	1	0]
				[0.04	0.15	1]
2	**8x − 3y + 2z = 45** **4x + 11y − z =71** **6x + 3y + 12z = 35**			**Upper Triangular Matrix:**		
				[8	-3	2]
				[0	12.5	-2]
				[0	0	11.34]
				Lower Triangular Matrix		
				[1	0	0]
				[0.5	1	0]
				[0.75	0.42	1]

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7791

LU-DECOMPOSITION

```
Import numpy as np
AX = 100;

def luDecomposition (mat, n):

    Lower = [[0 for X in range(n)]
             for Y in range(n)];

    Upper = [[0 for X in range(n)]
             for Y' in range(n)];

    for i in range(n):

        for K in range(i, n):

            Sum = 0;
            for J in range(i);
                Sum += (lower[i][j] * Upper[j][k]);
            Upper[i][j] = mat[i][K] - Sum;

        for K in range(i, n):
            if (i == K):
                lower[i][j] = 1;
            else:
                Sum = 0;
```

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```
        for j in range(i):
            Sum += (lower[k][j] * upper[j][i]);
        lower[k][i] = int((mat[k][i] - sum)/
                        upper[i][i];
    Print("Lower Triangular \t \t Upper Triangular);
    for i in range(n):
        for j in range(n):
            Print(Lower[i][j], end = "\t");
        Print(" ", end = "\t");


        for j in range(n):
            Print(upper[i][j], end = "\t");
        Print("   ");
    Print('\n L*U \n')
    Print(np.dot(lower, upper))


mat = [[83, 11, -4, 95],
       [7, 52, 13, 104],
       [3, 8, 29, 71]];
LuDecomposition(mat, 3);
```

Lower Triangular			Upper Triangular		
1	0	0	83	11	-4
0	1	0	0	52	13
0	0	1	0	0	29

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L*U

$$\begin{bmatrix} [83 & 11 & -4 \\ 0 & 52 & 13 \\ 0 & 0 & 29] \end{bmatrix}$$